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Journal of the Society of Arts.

FRIDAY, JUNE 22, 1855.

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ONE HUNDRED AND FIRST ANNIVERSARY DINNER.

The One Hundred and First Anniversary Dinner of the Members of the Society, of the Representatives of the Institutions in Union, and of their friends, will take place at the Crystal Palace, Sydenham, on Tuesday, the 3rd of July, at 4½ for 5, p.m., precisely. His Grace the Duke of Argyll, F.R.S., will preside, supported by the following gentlemen as Vice-Chairmen:—Viscount Ebrington, M.P., as Chairman of Council; Professor Owen, F.R.S., as representing Science; J. M. Rendel, Esq., F.R.S., as representing Mechanics and Engineering; Frank Crossley, Esq., M.P., as representing Manufactures; John Griffith Frith, Esq., as representing Commerce.

It is requested that early application may be made for tickets, as the Crystal Palace Company cannot make arrangements to receive nearly so large a company this year as on the former occasion, when it will be remembered between 700 and 800 gentlemen were present.

FOURTH ANNUAL CONFERENCE.

The Fourth Annual Conference of the Representatives of the Institutions in Union with the Council of the Society, will be held at the Society's House, John-street, Adelphi, on Monday, the 2nd of July, at 11 o'clock precisely. Viscount Ebrington, M.P., Chairman of Council, will preside. It is requested that Institutions will have the goodness to communicate to the Secretary, at their *earliest* convenience, the name and address of the Representative whom they may appoint to attend the Conference. The Council will be glad if Institutions would send in suggestions as to the subjects to be discussed. The Secretary would feel much obliged by Institutions forwarding him immediately a copy of their last Annual Report.

GEOGRAPHICAL ESTABLISHMENT AT BRUSSELS.

The following report, from Mr. T. Twining, Junr., Member of Council, and the accompanying letter from M. Corr Van der Mäeren, Honorary Member, will be read with interest:—

Twickenham, Feb. 23, 1855.

Sir,—The printed documents presented to the Society of Arts by M. Corr Van der Mäeren, an honorary member, through the medium of our worthy colleague, Mr. Winkworth, give interesting proof of the persevering and successful exertions of a Belgian *savant*, M. Van der Mäelen, in forming and maintaining an establishment of national importance, called the *Etablissement Géographique de Bruxelles*.

The print contained in one of the pamphlets affords us some assistance in appreciating the manner in which various branches of scientific knowledge, represented by well developed collections, have been grouped round the science of geography. This, which M. Van der Mäelen considers the *mother science*, is truly such in this instance, for, being carried on commercially, it furnishes, as it seems, the chief support of the establishment, the public being admitted free of charge to the gardens and collections, except on a limited number of days in the year, when a small contribution is levied for the benefit of the poor.

The government, though it affords earnest support and valuable assistance, does not grant any regular subvention. With a view to supply this deficiency, and to develope still more the practical usefulness of the undertaking, an attempt was made, in 1846, to found a *Société Encyclopédique*, but its aspiring attributes, which would have required a permanent staff of twelve first-rate intellects, were found too heavy for its limited number of promoters.

Another feature of the operations described in the pamphlets before us, is more deserving of attention. It is the publishing, under the name of *Epistémonomie*, of a *classified index* to all that appears in print, worth reading, on every branch of science or practical improvement. On this subject, M. Corr Van der Mäeren expresses himself as follows, in a letter to Mr. Winkworth:—"The *Epistémonomie* was never published in a regular manner, nor do I think it would answer to publish it periodically; however, you will be the best judge of what would be best to do in England. My proposition goes to get the Society to establish a practical index, where would be enregistered daily, upon small square tablets, in scientific classification, every occurrence, fact, and publication, that might interest science, art, commerce, and industry, and this, of course, to be done *au point de vue de l'Angleterre*. I propose M. Van der Mäelen's as a model as to form, and, judging from what has been done by the feeble means and exertions of one private individual, I am of opinion that, if taken up by your enlightened and persevering body, you would produce in a short time such a mass of information by such a simple process, as would astonish the public, and prove to be a *treasure of knowledge*."

I may be allowed to say that I take a peculiar interest in this scheme, having many years ago conceived a plan, not indeed for compiling so complete a register as the one mentioned, but for arriving at a somewhat similar result in a less elaborate manner. I contemplated (of course only in idea) the publication of a daily journal, furnished once a week with illustrations, and containing, besides a repertory of condensed information which would have entitled it to bear the name of *The Lens*, an impartial abstract of the summaries of other useful periodicals. The latter feature I ventured to recommend for the *Journal of the Society of Arts* at the time we established it, and it was in fact carried out to a limited extent in some of the first numbers. Whether it proved abortive from intrinsic difficulties, or from not having had a fair trial, it certainly was very soon dropped; but I must say that I have not ceased to entertain the idea that some expedient of the kind for obviating the perplexity in which we are perpetually kept by the dispersion of scientific and practical data amongst an unreadable number of periodicals, isolated from each other by pride and jealousy, might, under proper arrangements, be adopted with signal success, and I must beg to add that the example given, and the opinions expressed by our Belgian friends very much confirm my conviction.

I quite agree with Mr. Corr Van der Mäeren as to the desirableness of a personal inspection of the *Etablissement Géographique de Bruxelles* by some official delegate of the Society of Arts, and, if no earlier opportunity should offer itself for obtaining that result without the expense of a special mission, I shall be happy to undertake the task the first time I pass through Belgium on my way to or from Wiesbaden.

In conclusion, I beg leave to propose that the thanks of the Council be officially communicated to M. Corr Van der Mäeren for the papers transmitted to us, and the suggestions accompanying them, and that M. Van der Mäelen be appointed a Corresponding Member of the Society, as a testimony of the high estimation in which we hold the services rendered by him to the cause of scientific and practical knowledge.

I have the honour to be, &c.,

T. TWINING, Junr.

Brussels, January 17th, 1855.

SIR,—As honorary member of the Society of Arts, I consider it my duty to avail myself of every opportunity likely to enable me to be useful in promoting the great objects of the Society. I now beg to call your attention to a subject which appears to me to be of the greatest importance to science.

The celebrated "Geographical Establishment" of Brussels was founded in 1830, by Monsieur Philipe Van der Mäelen, with the object of promoting the study of geography taken in all its bearings, so as to embrace the study of the universe, of its natural productions, and to make of that science a centre around which would converge the different branches of human knowledge. I send to you with this letter some printed papers, which will show you some of the results obtained by 25 years' intelligent perseverance and constant labour by Monsieur Van der Mäelen. I wish to draw your particular attention to his "Epistemonomia," or what I should prefer calling, his "Practical Encyclopædia," or general tables of indications to every branch of knowledge. You will observe by the paper No. 3, that ever since 1834, Monsieur Van der Mäelen has been incessantly collecting the necessary elements to form a "Société de Renseignments." Pursuing that object without interruption, he is now in possession of many thousand notes or "bulletins." The paper No. 4 will give you a tolerable idea of the interest of those general tables, of which the classification has since been continued in a variety of subdirections, so that the "Practical Encyclopædia" is at present a room, fitted up with an endless number of small drawers, containing, in alphabetical order, notes and references to all the publications existing, and that appear daily, upon every subject relative to art, science, manufacture, and commerce. This mass of information is doing useful service to public writers, who visit it daily. Monsieur Van der Mäelen's establishment must be well known to many of the members of your Society, and I have seen upon his visitors' book many names of English celebrities, who could give you an opinion upon the subject.

No country has practised more or better than yours the maxim of "time is money," and it occurs to me that this valuable maxim could not be applied to more perfection than by transferring a copy of Monsieur Van der Mäelen's "Practical Encyclopædia," to your Society's house, and by having it followed up with that scientific precision and perseverance of which you have shown us so many examples in carrying out useful discoveries. I have already mentioned the subject to this persevering friend of science, and I found him willing to enter into my views in the most disinterested manner. If you think it worth while, perhaps you would kindly communicate my "project" to your Council, and if they entertain it, I put myself at their disposal to give them more detailed information, and I offer my aid, as honorary member of your Society, to carry it out.

I remain, dear sir,
Yours very sincerely,
CORR VAN DER MAEREN.

P.S. I hope you will excuse my clumsy English in favour of the object in view.

DIRECT NATURE-PRINTING FROM WOOD, IN AN ENDLESS WAY, APPLIED TO THE DECORATIVE ARTS.

By Felix Abate, of Naples.

In the first communication I had the honour to make to the Society of Arts* on this invention, I described two different processes which I employ for the purpose; the one of them depending upon the effects produced by the joint action of acids and heat upon vegetable substances; and the other, a more complex one, as it comprises the different processes upon which the art of dyeing and printing textile materials rests. Both these processes, by different means, produce nearly identical results.

In order to bring my invention to practical utility, and make it serve the various purposes of the decorative arts to which it may be applied, I thought it was requisite that the nature-prints should be made in an endless way, as is done for woven stuffs, which, besides being an essential point for the application of the invention to house decoration, is undoubtedly the most suitable way to obtain that cheapness of manufacture which is the first condition for the general adoption and success of every new invention. I had then to choose between the two above-mentioned processes to which of them I should give the preference, and I found the second one to be in many respects superior to the other.

A machine, constructed upon the principle of the cylinder printing-machine, was then requisite for my purpose, in which the printing cylinder should be made, either solid or veneered, of the wood from which impressions are intended to be taken. However, this contrivance, which in the last quarter of a century has brought such important results in the art of printing textile manufactures, could not be applied to the above purpose without meeting with peculiar difficulties, against which, in fact, I had long to contend. The most serious of these difficulties were two—the one was, in contriving a self-acting apparatus for feeding the cylinder with the requisite fluid, at such a constant and controllable degree as experience has found suitable in the printing with flat blocks by manual labour; the other was in the discovery of some new means to dispense with the bathing of the printed stuff either in a mordant or in a colouring bath, whenever paper is the stuff to be printed on; as unsized paper, which is the most suitable for the purpose, will not bear, in a wet state, being drawn through the machine. Besides, it was desirable that the different successive operations which are performed in printing textile manufactures should be done at one time and in a single revolution of the machine, in order to reduce the cost of manufacture to its minimum.

I have made the cylinder-feeding apparatus in the shape of a trough, in which the wetting fluid is kept at a constant level through a reservoir from above and a discharge from below. A cloth, one side of which is immersed in the liquid, acts by capillary attraction as a syphon, and communicates the liquid in a continuous supply to the revolving cylinder with which it is in contact from the other side—an elastic cushion placed between the trough and the cloth securing the requisite equality of pressure of the latter upon the cylinder, while a pair of screws pressing on the back of the trough serve to regulate at will the degree of such pressure. This apparatus answers the purpose perfectly well.

In order to dispense with the bathing of the printed stuff, I had recourse to the metallic sulphurets, which are known to produce more lasting colours than the vegetable dyeing stuffs. Therefore I contrived to obtain the required effects by using for the printing menstruum any of those metallic salts, such as copper, iron, &c., which by the action of hydrosulphuretted acid or alkalies are precipitated in the state of metallic coloured sulphurets; I use such reagents in the gaseous form, such as hydrosulphuretted ammoniacal gas. The printed stuff is made to pass direct from the cylinder after it is printed, through a box, which is kept constantly supplied with a current of gas; it comes out of the box completely finished; then, passing through a stove kept at a moderate heat, dries—and lastly winds itself round a reel, ready for sale. In this way the thorough printing of the stuff in a single revolution of the machine is performed.

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* See *Journal of the Society of Arts*, Vol. ii., p. 539.

The principle of using the hydrosulphurets in the gaseous state in the art of dyeing, which, as far as my knowledge goes, has never been done before, is of considerable importance in that branch of manufacture, as it produces the most satisfactory results with the greatest convenience and cheapness, while it entirely obviates the evil arising from the noxious evaporations of the hydrosulphurets when used in the liquid state and left to evaporate in the open air.

BANK NOTES.

The following is the second part of the paper on Bank Notes,* &c., read by Mr. Thomas Grubb, M.R.I.A., at a meeting of the Royal Dublin Society :—

In that portion of my paper on Bank Notes, &c., which I had the honour of communicating to the last sectional meeting, it will be recollected that I had proceeded so far as to show that the economic production of a bank note would be incomparably better consulted by procuring a sufficient general excellence for it, by or through the merits, or other suitable qualities, of the subject-matter, or design printed in the paper, rather than by an elaborate water-mark formed in the paper itself. This economic advantage of "printing" over "paper," as a vehicle for including adequate protection against forgery of bank notes, will be evident on considering, first, the relative cost of note paper and note printing; secondly, the large additional expense incurred by adopting a highly water-marked paper; and thirdly, the small additional expense of adopting a high class of subjects for a portion of the printed matter of the note. To exhibit this advantage more clearly, I have constructed the following table, in which the cost of printing a plain note without designs, by the usual or copper-plate process is represented by the number 10. The cost of printing an elaborate note by the same process by 11; and cost of printing a note by the surface or type-printing process by 7. I further represent the cost of the best note paper, having a small quantity of water-mark, by 20; and the same quality of paper highly water-marked, by the number 40. By combinations of these we obtain as follows :—

	Relative Cost.
Plain water-mark paper	20
Plain printed subject	10—30
Plain water-mark paper	20
Best printed subject	11—31
Highly water-marked paper	40
Plain subject	10—50
Highly water-marked paper	40
Best subject	11—51
Highly water-marked paper	40
Surface printing	7—47

The numbers in this table are to be understood as representing approximately the relative cost of the several items. The table itself illustrates at a glance the previous assertion as to the manner in which the economic production of the note will be best consulted.

I now proceed to discuss that important question connected with the production of bank notes, viz., the best means of rendering them non-liable to fraudulent imitation. As a preliminary, it is desirable to consider what, in respect of this quality, we should, if practicable, accomplish—the more so, as some persons appear to form a much lower estimate than others of what should or need be here attained. It has been elsewhere stated of a bank, that a forgery of its notes has never escaped eventual detection, let it be inquired what this means—a bank cannot be supposed to issue notes of duplicate number and date in the course of many years, therefore whenever it receives a forgery of one of its own notes, without immediate detection, and that the genuine note of corresponding number and date either had previously returned to the bank, or does subseqently return to it—the bank will then find that it has received duplicate notes, one of which must of necessity be a forgery, and a minute inspection must tell which is the genuine, however indifferent it may be in execution or design—its very defects will help the discovery. Therefore, we must conclude that eventual discovery is in such cases certain, and no proof of the excellence of a note, and that a bank which adopt the precaution of requiring the name and address of each party from whom they receive notes (genuine or forged), and do not reissue their notes, will run but little risk, and an individual who adopts the same precaution, and in addition marks each note sufficiently for after-identification likewise runs but little risk, while the general adoption of such inconvenient practices would indeed render forgeries nearly as convenient a representative of money as the genuine notes. Experience, however, shows that the public will adopt no such precautions unless driven to them by repeated losses, nor can nor should it rest satisfied so long as forged notes appear, which are only to be discovered as such by the comparison of duplicates or a scrutiny of trained eyes. No bank or public should, in my opinion, rest satisfied (so long as it can be otherwise provided) with a less amount of protection against forgery than that derived from a note of which there is no present probability of its being forged in a manner likely to avoid detection when examined by what may be termed a glance of an educated eye, or a moderate inspection of an ordinary one. I have in the course of my argument to encounter several, to my mind, erroneous assumptions and conclusions. One of these being opposed to the preceding view I shall allude to first. A gentleman, a director of an English bank, on being questioned why his bank did not print on their notes a subject more difficult of forgery, stated that as any note, however difficult, could be imitated, and as their note was well known to the public, they considered it better not to alter it. While I admitted the latter part of this reasoning to have force in itself, I illustrated my opinion of the former part by asking would he, because any lock might be picked, approve of putting a half-crown lock upon their iron safe, or would he not rather put the best which could be procured although it might be picked. The argument of the director is indeed untenable, either on general principles or on our knowledge of the case under consideration. If the plundering of the safe be rendered much less likely by the adoption of a Bramah or Chubb's lock instead of a common one, the successful forgery of the note is rendered still less likely by the adoption of a suitable engraving. An ordinary pick-lock may, by what is termed "chance," pick the good lock, but a good copy of a good historical engraving never was nor is it ever likely to be a work of "chance," while experience shows us that no artist of even moderate acquirements in historical engraving is likely to debase his burine by the execution of a forgery.

There is a class of protections against forgery which may be defined as one in which the remedy proposed is nearly as bad as the disease. One of this class is a proposal to print on the paper of the note a design which shall be generally invisible, but capable of being rendered visible whenever it is desired to ascertain the genuineness of the note by immersing it in hot water, which brings out the design if the note be genuine. The author of this ingenious process has not stated the only advantage it seems to possess, viz., that its general adoption would in itself be sure to keep every one in "hot water." A scarcely more unpracticable or inconvenient test of the genuineness of a note has been lately suggested in the unvarying number of lines in the background of a vignette. To make this test available would require 1st, a magnifier; 2nd, a pointer; 3rd, a steady hand and practice; and 4th, some minutes devoted to each note. The hot-water system, after all, may be preferable. There is a class of work which from its minuteness was expected to be a preventative both of alteration and forgery; I allude to that very fine writing in which the amount of the note is repeated some thousand times. The letters are too small to be read without a magnifier, consequently they are of little use for preventing the alteration of the sum of the note, while the writing is too easily forged to prevent imitation. In an impression from a forged plate of such a note I find this band of fine writing the best executed portion of the work. For the prevention of alteration in the sum of the note, some American banks caused their notes to be engraved with such difference of device for each denomination that the public were left without a general resemblance for their guidance. This has led to a curious and unforeseen result. The forgers ceased to be imitators, and issued notes of their own designs in lieu, which, in the confusion arising out of the multitude of designs of the genuine notes, pass current.

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* The first part was printed in No. 118 of this Journal, pages 238 *et seq.*

The watermark in the paper of the note is a distinct class of protection in itself, and requires a special consideration. Used in connection with other means of protection, it is valuable and by no means to be dispensed with, but I must be allowed to differ *in toto* with those who would place their all but entire dependence upon its protective power; nor can I agree with the reasoning of those who because that which is done by one man may be copied by another, apply this truism at once to the rejection of all improvements in the printing of the note, and the utmost refinement of the water-mark. There appears, indeed, to be no slight mystification, if not misunderstanding, with respect to the principle on which the protection afforded by the use of a water-marked paper rests. The genuine water-mark, or a good imitation of it, cannot be formed after the paper is made, and therefore to procure a good fraudulent paper requires the apparatus of a paper-mill, while, to make a single sheet of paper with or without a water-mark, within the British Isles, is to come under the surveillance of the excise. Secondly, any additional difficulty in making a sheet of paper, the mould being once prepared, arising out of excessive water-mark, is almost nothing, provided the mould be in size only sufficient for the paper of a single note, or two such. It is, therefore, evident that, with the exception of the preparation of the mould, a small amount of water-mark is just as great a bar in the way of forgery as the most elaborate. And now, to consider this difficulty of the mould, will the man who would sit down to make a fraudulent mould, requiring, it may be, a score of letters to be formed in wire and stitched down on the surface, be deterred by having a second score to imitate and a double quantity of stitches to perform? And whether, I would also ask, is it more likely that forgery will be prevented by a contrivance requiring, perhaps, a couple of days' additional time of a mould-maker or wire-worker to copy, or by the adoption of such engravings for the note as would require for the production of a reasonably good copy as many months of the time of an artist following a respectable profession.? Partly, therefore, to the quantity of utensils and the outlay required for the production of a single sheet of paper, but chiefly to the excise surveillance of this kingdom, are we indebted for the preventive effect of any water-mark—whether it be much or little—in respect of forgery. But as our Continental intercourse increases, this sort of prevention decreases, and factitious water-marks, as they may be termed—which are produced by pressure and varnish, and easily distinguished as such—are being replaced by genuine forgeries (to use an Hibernicism), or water-marks oduced in manner similar to the genuine; that is to say, in the manufacture of the paper. In corroboration of the foregoing may refer to the recent accounts in the newspapers of forgeries of the £5, £10, and £20 notes of the Bank of England, which are stated to have come from the Continent, and of which upwards of £200 in apparent value had already appeared at the bank. The water-marks in these were, as in the genuine, different for each value of note, and are stated to be perfectly well executed, and produced in the making of the paper. This instance of rather wholesale water-mark forgery is a striking illustration of the error of depending too much upon the paper of the note for protection.

Let me be clearly understood as being equally far from agreeing with those who suppose that a note can be made inimitable; and others, who because it cannot be made so, will not adopt all means, within reasonable limits, for rendering it non-liable to fraudulent imitation. It is scarcely matter for surprise that amongst the many suggestions for the prevention of forgery much of error should be found. To prove that any means is adequate to the desired purpose, it is not sufficient to show that it prevents forgery by the aid of any one or other specified process—it must be shown that it prevents its accomplishment by any process extant, and within the forger's reach. This is all but equivalent to proving a negative, and hence some serious mistakes. One such mistake, committed many years back, was that of assuming, that by engraving a single head or figure, and with the aid of the rolling process—alluded to in the former part of this paper—forming from it a line of fac-simile heads or figures, and printing the latter on the note—the forger, not having access to the machinery required for such processes, would lie under the necessity of engraving the whole line seriatim. The late Sir W. Congreve showed the error of this assumption. By means of a fine wood-cut copy, and a repetition of the printing process only from it, he produced a line of heads, perfect fac-similes, and sufficient in other respects for the forger's purpose. Here, however, it must be admitted that the forger was placed at disadvantage, in having to imitate that which in the original was produced from an engraved plate by the coarser processes of wood cutting and surface printing. Another instance of such errors of recent occurrence, consists in assuming that by the adoption of surface printing from electrotype copies of finely cut type or blocks, protection is obtained from the difficulty of cutting such superior type, forgetting that it is by no means necessary that a forgery should be produced by the same process as the genuine note. In the instance before us, the forger has the option of using the much easier method of imitating the surface-printed note by an engraved plate and copperplate printing. The error is here rendered of more importance by the circumstance, that in the adoption of a process of medium delicacy for the production of the genuine note, the forger is placed on 'vantage ground by the power thereby gratuitously presented to him of copying it by means of a process of higher delicacy. It may be supposed by some, that the more delicate the process the greater care or experience it requires. It is not so in the case before us, which is that of producing a given result by either a finer or a coarser process; planing (for example) is a more delicate process than chiseling, yet the best surface, plain or grooved, cut by a chisel, would be readily equalled by indifferent planing. A few letters, or a word, which could be engraved in the best manner in three hours, would require a week's time of a good artist to cut in type, and after printing, the latter would give an inferior result to the engraved word. The special difficulties appertaining to the adoption of a "surface printed" note go all to the wrong side; they have to be borne altogether by the fabricators of the genuine note—the forger goes scot-free.

I shall conclude this enumeration of errors by an allusion to one, of which a slight mention was made in the former paper, and which bids fair to eclipse the rest, viz.,—that of adopting such means for the production of the genuine note as facilitates its successful imitation by lithography or analogous processes. Now, there are two ways in which this error may be committed, one of which lies in the use of a description of ink well suited to lithographic transfer; the other in the adoption of a description of printing, which, in its general effect, approaches that obtained from lithographic processes. There can scarcely be supposed a more striking instance of this error than in the employment of surface printing, as not only is the general effect produced by it well represented by lithography, but the ink employed in such printing is, so far as I can learn, necessarily of a nature well suited to be transferred (from a note so printed) directly to the stone, and so enable an ordinary lithographer to print fac-similes of itself.

It now becomes me, in conclusion, to mention shortly those things which practical experience proves to conduce mainly to render bank notes non-liable to fraudulent imitation. The paper should have a water mark, which, for reasons already mentioned, need not in its quantity be such as would materially increase the cost of the paper. For the printing "copper-plate" so called, should be the process used, as possessing at once the greatest delicacy and the greatest power of light and shade; also as being farthest removed, in its general effect, from that of any other and lower method of printing, more especially lithography; also as the printing-ink used is of a nature badly adapted to lithographic transfer; also as being the only process extant capable of rendering on bank-note paper, and with rapid printing, that combination of delicacy and force which gives effect to an historical engraving. For the subject matter or design, in addition to the needful mercantile portion, I would include both historical and machine engraving. I would use both these, because they are branches of the engraving art scarcely ever combined in the practice of one individual; and experience shows that by increasing the number of hands requisite to produce a forgery, we throw a great obstacle in the way of its perpetration. I would use historical engraving, because it is only to be copied by hand, also as being the highest class of engraving; and as those who attain any proficiency in the art are, from their position, little liable to be tempted to descend to forgery. I would use machine engraving, because, if it be chosen of a suitable description, it will be most difficult to imitate without the aid of a machine, and we know that forgers are not likely either to incur the expense or brook the delay of obtaining such. Lastly, in the selections of subjects, both historical and machine-engraved, I would be governed by previous experience, selecting such subjects as are best adapted to being engraved in single line, without cross hatching, and with strong effect of light and shade, avoiding work of a very fine character, and selecting that whose lines and markings can be seen as such by an ordinary unassisted eye. With a combination of such paper, designs, and printing, we obtain a note, which not only has the recommendation of being in a high degree economic, but which, also, experience proves, to be not liable to successful forgery. Such a note is liable to be well imitated only by artists of respectable standing, from whom we have nothing to fear; or, if copied by low art, the deception is sure to be nipped in the bud, and the forger certain to find that he is running a serious personal risk for that which will not pay. This will have the effect of discouraging both himself and others of the same craft from further attempts on such notes. In a country where one-pound notes are the chief medium of currency, it would be a serious drawback to business if, to insure their genuineness, it were necessary to make a minute scrutiny of the notes, or examination of the water-mark. Our present one-pound Bank of Ireland note, in which my views are sufficiently carried out to render it a type of the system advocated in this paper, has, as already mentioned, had a five years' perfect immunity from forgery, a circumstance which, in itself, may give some weight to my statements, and, perhaps, I may be allowed to add, some claim to that attention with which this paper—on, as it must be confessed, a rather uninteresting subject—has been received.

Home Correspondence.

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THE NATURAL PRODUCTIONS OF BRITISH HONDURAS.

Belize, British Honduras, April 16th, 1855.

Sir,—I have forwarded to Sir William Hooker, the manager of the royal gardens at Kew, by this packet, a bunch of Cahoun nuts. It measures about four feet in length and nearly two in breadth. There are bunches even larger than this. I have also sent to him, at his request, a bottle of Cahoun oil. I indulge a hope, from the fact of men like Sir William Hooker, so eminent in science and social position, taking an interest in the subject, that this valuable commodity will soon become very extensively known and duly appreciated. I will take an early opportunity of forwarding to your Society a similar bunch of these nuts.

I have made some ineffectual attempts to obtain specimens of the Guaco, but the natives confiding implicitly in its medicinal virtues in cases of snake bites, are so eager to procure it, that it has become exceedingly scarce within a considerable distance of the town of Belize. In the southern portions of the settlement, amidst the silence and solitude of the almost impenetrable forest, where human footsteps rarely tread, that plant, with innumerable others, as yet unsubjected to botanical scrutiny, may be found in great abundance. I have, however, succeeded in obtaining a small quantity of the tincture of this extraordinary vegetable product, which I send to you by the present packet. Whether it will be found equally efficacious with the fresh plant I am unable to say, but an experiment might be tried. You will perceive that it is a very strong bitter.

A rather amusing, if not a veracious account, is given of the manner in which the guaco was first discovered. It is said that "once upon a time" a curious and observant traveller, whilst wending his dreary way through one of the forests of this country, and not unwilling to enliven his solitary route by any passing circumstance capable of affording him amusement or food for thought, halted to watch a deadly encounter between two formidable snakes; "they were too busy to *dart* at him." In the course of a little time one of them was severely bitten, when, to his great astonishment, it *fled* from the scene of combat, 'scuttling along the ground and winding with great rapidity

"Amongst the untrodden ways;
"A *snake* whom there were none to praise
"And very few to love."

He had the curiosity as well as the courage to follow it, and by-and-bye he perceived that it stopped near a creeping plant, of the leaves of which it partook with greediness. That plant was the guaco. He secured the reptile, and also brought away the plant of the leaves of which it had eaten. The snake, although bitten by one of a most deadly species, quite recovered,—it was supposed in consequence of the remedy to which instinct had directed it. As Herodotus would have said, "This I was told (not, however, by the priests), but I do not vouch for its correctness; you can believe it or not." Another account is given. It is said that the snake will not come near any place where the guaco grows, and its careful avoidance of such localities having been observed, the cause had been investigated. Many persons are so firmly persuaded that the snake will not approach the guaco, that when travelling in the bush they carry a small piece of the root of that plant in their pocket.

There is another plant which the unskilled natives of these tropical wilds esteem as little inferior, if at all, to the guaco. It is called the rat root. It is also a creeper, and it is considered to be a certain remedy for all snake bites. The odour of the plant is extremely offensive, and not unlike the fragrance of that proscribed animal whose name it bears. It is administered in the following manner:—A decoction made of the leaves is taken internally, and a blister, composed of the scraped root, garlic, and salt, is applied to the wound. I shall procure some of this plant and forward it to your Society, for I think that even savages would not adopt as a remedy for certain diseases preparations of particular plants, if those plants did not possess *some* virtue. I mean, of course, when they are applied in a rational manner, not used superstitiously, as charms and amulets, nor when the efficacy is supposed to depend upon their being gathered when the moon is at the full, or when a certain star is in the ascendent. Such plants, therefore, as the one which I have been describing, which have obtained amongst a rude and uncultivated people an experimental remedial notoriety, are well worth the attention of the naturalist, and merit an analytical investigation of the scientific. Even if the exact qualities ascribed be not discovered, others may be perceived equally, or more valuable, as the alchymists, in the vain pursuit of a phantom, stumbled upon the substantial discoveries of gunpowder and alcohol.

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* It will be observed that several of these letters are dated some weeks back. Want of space has prevented their insertion earlier.—Ed.

There is a considerable variety of the cactus in these regions, the most prevalent of which is the prickly pear. The leaf of this cactus is broad, and is covered with strong sharp prickles, about two inches in length, as well as an infinite number of almost imperceptible thorns, both of which inflict a very painful wound. This plant is admirably adapted for fences, it being completely impervious to every animal. It bears rather a large yellow flower, and a fruit, the juice of which is a rich crimson, very similar to the dye obtained from the cochineal, which insect, it is well known, derives its colour from another species of cactus, on which it feeds. I cannot help thinking that the juice of the prickly pear is capable of being turned to valuable account, and under this impression I have ventured to send you two small bottles of it.

This country, from the nature of its climate, and the vast quantity of swampy land which it contains, might be made to produce as fine rice as that which is grown in Carolina or the East Indies. I have sent you a sample of the rice of Honduras, a grain which has not yet been cultivated here to any extent, if at all. The sample which I have forwarded was grown by a Mr. Rohr, a German, possessing very considerable agricultural knowledge and great energy, who has within the last two or three years purchased a large tract of land, which he is cultivating with much success. If the quality of the rice submitted be approved of, he would lose no time in sowing a large portion of his property with that nutritious grain, with a view to exportation. I should observe that he is able to produce a much finer rice than that which I have sent, for no pains were taken in its cultivation, either by keeping the ground clear, or any other necessary proceeding.

I have also sent a small sample of the wild cotton of this country. It will not, I dare say, be considered of much value, but I think it will readily be believed that if such be the spontaneous growth of the soil, a much superior article might be produced with care and attention, and the appliance of those means which science and skill would suggest.

I have likewise directed to be forwarded to you some seeds of the marengo tree. This is a large, wide-spreading tree, the wood of which is extremely brittle, and the leaves small, delicately formed, and drooping from the branches in graceful clusters. It bears a small, white, waxy flower, faintly tinged with yellow at the base of the leaves. From the seeds of this tree an excellent oil is extracted, which is said to be highly efficacious when applied to capillary purposes. The small roots of the tree are a very good substitute for horse radish.

On the Mosquito shore there grows a nut called the Ebol nut, from which a valuable oil is made, which is also said to be highly productive of "ambrosial curls." The natives of that coast have remarkably long, straight, black, shining hair. Whether the fertility of their heads (and they are fertile in more ways than one) arises from the use of this oil, I cannot say, but I have been told that they *do* use it very profusely. I have been promised some of these nuts, as well as some of the oil, both of which I shall have the honour of forwarding to you as soon as they are received.

I purpose to transmit to you by the next mail, if you think it will be interesting, a brief historical sketch of British Honduras. The early history of this country is contained in an excellent work, entitled "The History of Yucatan, from its Discovery to the Close of the Nineteenth Century;" published in 1854. The author of this book is Colonel Fancourt, a gentleman of great ability and industry, who for a space of eight years administered the government of British Honduras with singular skill and success, contributing largely to its prosperity, adding to the town of Belize a number of handsome public edifices, and introducing many sound political reforms. The account given of Honduras by Mr. Montgomery Martin, in his book called "Statistics of the Colonies of the British Empire," is very incorrect; and that contained in M'Culloch's Geographical Dictionary is scarcely more accurate. Mr. Martin says: "The British settlement of Honduras, in the province of Yucatan, is situate in the southern part of the American continent." The most southerly portion of British Honduras is 17·28 to the north of the equator, and seven degrees north of the Isthmus of Panama. Neither is British Honduras in the province of Yucatan. That portion which is north of the river Belize is said to be in the above-mentioned province, but all to the south of it is in the province of Guatimala. He says, "The inland boundaries are ill-defined. According to Henderson, the line which includes the settlement commences at the mouth of the Rio Grande or Hondo." The Rio Grande and Rio Hondo are not one and the same river, as he supposes, but two distinct rivers, the mouths of which are considerably apart from each other. He says, "The sea coast of our territory of Honduras is flat, and the shore studded with low and verdant isles." If he means by verdant, simply that they are green, that is true enough; but if he means that they are fertile, he is in error. They are nothing but mere sandbanks, producing nothing but mangrove bush. Some of them have not a foot of dry ground, and are called water-kegs. He says, "Veins of fine marble, and mountains of alabaster, are known to exist. Valuable crystals have been found within 180 miles of Belize. * * Gold has at various periods been found in the Roaring Creek, a branch of the Belize river." This is perfectly new to me, and must be, I am persuaded, to every resident in Honduras. Veins of marble, and mountains of alabaster, are an amusing fiction; valuable crystals are yet to be discovered; and Roaring Creek may roar until it is hoarse, before anyone will believe in its auriferous qualities. That the existence of gold in British Honduras is not only possible, but probable, I verily believe, for in the neighbouring states of Honduras, Costa Rica, and Guatimala, gold and silver mines have been worked for many years, although not so profitably as they might have been had European science and capital been brought to bear upon them, and they had been entirely taken out of the hands of the feeble-minded and apathetic people who had control over them; for the inhabitants of all the Central American States, being a mixture of the old Spaniard and the Indian, are a degenerate race, possessing not one estimable quality, but given up to sloth, dissoluteness, and every filthy and disgusting vice which can degrade the human character. I do not think that in British Honduras gold has ever yet been discovered. Not very long ago, the late Dr. Rhys, a gentleman of intelligence, planned and executed an expedition, the object of which was the discovery of gold, but it ended in disappointment. A few years since a captain of artillery got it into his head that he had found a gold mine, and he commenced a correspondence with the Government upon the subject, who believing in his representations, sent out the terms on which they would dispose of crown lands containing gold. The gallant officer had resolved to retire from his profession, turn his spear into a pickaxe, his sword into a mattock, and become a miner. But instead of a gold mine it turned out to be a mare's nest. I think, however, it would be very much to be regretted if gold *were* to be discovered. The true and most permanent source of a country's wealth are its vegetable productions. A sudden and unlaborious leap into the possession of immense wealth has the same effect upon nations as upon individuals; the latter indeed may under peculiar circumstances preserve their moral and intellectual balance, and make a prudent and good use of unanticipated riches, but a nation it invariably demoralises. To eat bread by the sweat of one's brow is the lot of man; and bread so eaten is assuredly sweet. It is sweet both physically and morally, for the consciousness of having earned our food produces an inward glow of satisfaction. The gradual approach to wealth which the cultivation of the soil or commercial or professional occupations exhibit, educates those who attain to it for the judicious employment of it. Such employments are accompanied by all the virtues, an harmonious train, producing peace, health, good-will, and love. Industry, steadiness, sobriety, respect for the laws, —these are the accompaniments of those who select that road to wealth which the loom or the plough mark out. But indolence, depravity, selfishness, extravagance, rapacity, disregard of all laws, human and Divine, ever attend those who have been precipitated into the possession of wealth by the discovery of gold. But all this has been said before fifty times; I will, therefore, return to Mr. Martin. Not dissimilar from his marble dreams, and alabaster visions, his "crystal palaces," and golden prospects, was the story by which a "simple shepherd swain" was deluded to abandon his work, throw away his oaten pipe, forsake his bleating companions, and bid adieu to the "sunshine and the shade" of the green hills and sequestered vales of his "faderland," to visit the burning sands and inhospitable shores of the torrid zone. He was told that it was the "land of the turtle" and the region of punch; that he could pick up the former *ad libitum* ready dressed, and drink the latter *au naturel*, for rivers of rum flowed through groves of lime trees and fields of sugar cane.

I merely quote these passages from Mr. Martin's account of British Honduras, for the purpose of showing the necessity which exists for a correct account of that settlement. I will trouble you with only one more quotation. Mr. Martin says, "The militia of Honduras is a very fine body of men, about 1,000 strong, and consists of a brigade of Royal Artillery and a regiment of the line." This speaks for itself. When we are informed that the *militia* of Honduras consists of the *Royal Artillery* and a *regiment of the line*, nothing more need be said.

Apologising for this long, rambling, epistolary effusion,
I have the honour to be, sir,
Your very obedient servant,
R. TEMPLE.

PUBLIC WORKS FOR INDIA.

Sir,—Having experienced the inefficiency of set speeches in eliciting information on such subjects; having been frustrated in my endeavour to introduce the mode of question and answer at your late meetings, and being hopeless of making the subject of "Public Works for India" plain by epistolary correspondence, I had not intended to address you, although you politely offered the pages of your *Journal*. The letter, however, of my friend Colonel Cotton, which appeared in your publication of the 25th ult., requires notice, and I must crave a small space in one of your early numbers.

Colonel Cotton, in reply to my question, "How rivers which wander through wide beds of sand can be made navigable for large and speedy steamers ?" says that rivers may be made navigable by storing up water in the wet season, to be flushed into the beds during the dry; and he thinks I am ignorant of the fact that boats of 400 tons are *towed* on the Ganges.

With regard to the expedient of storing water to be used in deepening the channel of a river, certain conditions appear to me to be necessary. First, the country must be undulating, offering valleys of great extent as reservoirs. Secondly, the channel must be of tolerably compact section.

Now, the Ganges, Jumna, Sutlej, and nearly all the great rivers of the plains, after breaking through the tertiary ranges of the Himalaya mountains, traverse a country which I can compare to nothing more aptly than a table slightly tilted at one end. The difficulties of storing water in such a country appear to me to be insuperable at any reasonable cost. Within the hills the slope is too great to admit of any large body of water being collected in the river's bed.

That the section of channel to be deepened must be tolerably well defined, in order that it may be improved efficiently by the reserved waters, will, I think, be evident on consideration. Thus, in a channel bordered by well-defined banks, a certain additional volume given to the stream might deepen the channel by two feet, but where the stream flows in flat banks of sand, where a rise of a few inches would spread the water to a great width, this expedient must fail of producing useful results.

I am aware that the experiments on the Jumna, alluded to by Colonel Cotton, appear to favour his views. The water-gauges were, however, placed for the sake of convenient registry at large towns. Such towns are usually situated at spots most favourable for river communication, that is, where the bed is best defined. Two of those places alluded to, Agra and Delhi, I know to be so. At both, the dry season supply is collected, by circumstances of ground, into single channels, enabling the authorities to keep boat bridges across the river during the four seasons. These are the very places where assistance is not needed.

With regard to canals: when at your second meeting I expressed a doubt as to the practicability of making high-speed steam boat canals in India, a gentleman who followed, misunderstood me to say that, "Indian rivers were not susceptible of *canalisation*." If by this term is meant diverting the waters of rivers into canal channels, it is only necessary for me to state that I have been officially connected with the finest canals in India, and that I have ever been a steady and zealous advocate for canals, and that I used all my little influence in supporting Sir Proby Cautley's noble project of the Ganges canal. It is my knowledge of Indian canals that makes me doubt whether they can be made serviceable for speedy steamers. It is quite true, as Colonel Cotton states, that the Ganges canal is to carry a head of water ten feet deep. But this is on the solani aqueduct, where the water is curbed by walls of masonry; but no one hopes to retain that depth in sandy soil. Then, again, the trunk soon becomes divided into several branches. Each branch grows "fine by degrees and beautifully less," as the waters are expended in fertilising the fields, until they become small filaments of water, quite incapable of floating a steam boat.

The navigation for slow boats could, of course, be opened to Allahabad, but it must be done at the sacrifice of irrigation. Thus another field of controversy may be opened out. I will, however, only remark, *en passant*, that having already a cheap downward transit by the rivers Ganges and Jumna for the produce of the Doab, I think it better to devote all available water to the purpose of increasing the produce, leaving the return or up transit to be made by railways.

I am an old Bengalee, and am, of course, aware that boats of large size are *towed* upon the Ganges, but this fact does not prove the river to be fit for large and fast steamers, or why are we to consider the question of Ganges improvements. Surely we have the very water trunk required by my gallant friend, and surely some English company will be found to run such vessels as the Mississipi steamers from Calcutta to the north-western provinces. But, if this illustration of the river capabilities be fallacious, if the navigation be really impeded by numerous shallows, if we fail of scouring the channel for want of stored water, there is still another remedy projected by Colonel Cotton. It is, to dam the bed at places sufficiently numerous to give a series of deep and nearly level pools or basins, connected with each other by means of locks.

To this expedient I urge the old objection; it is applicable only to certain rivers, amongst which the great rivers of the plain cannot, I think, be classed. The Ganges is a good specimen of the rest. Its bed is a hollow, often five miles in breadth, and from 20 to 40 feet deep, scooped out of a gently sloping plain, consisting of a superstratum of light arenaceous clay, from six to twenty feet thick, overlying a bed of sand of unknown depth. To dam such a river would be attended with enormous expense, and, I think, with unstable results. But even were we to succeed in curbing the river by this dam, the waters would, during freshes, make for themselves new channels, turning the flanks of the dam. Persons unacquainted with the plains of India can hardly imagine the difficulties which an engineer has to contend with in dealing with rivers in sandy soils.

I regret that the interesting subject of "Public Works for India" has assumed the form of a battle-royal between canals and railways (as well as of hostility towards the government of India). There is room in that vast empire for both. Railroads will do work where canals cannot reach—canals will carry at cheaper rates than railroads. Let them select their appropriate lines of country. If we are urgent that government should lay out their money in developing the resources of India, it is inconsistent in us to quarrel with them for adopting heartily the first scheme of general improvements brought before them by a substantial company. If the friends of water transit are satisfied of the soundness of their views, let them organise a company, as their opponents have done, and lay before government an offer to pervade every district or any number of districts with water trunks, and I feel persuaded that their scheme, if worthy of trial, will meet with the same favour that railroads have done at the hands of the government of India.

Yours, &c.,
F. ABBOTT.

Addiscombe, June 2, 1855.

P.S.—In the report of my remarks on the 7th of May I notice a little inaccuracy, which makes me say the reverse of what I meant. It occurs at page 438, column 2, lines 18, 19, 20, and 21 from top, which now read, "and insufficient to carry steamboats of large burthen—he meant in the peninsula of India. He could understand that it might be so in a hilly country; where we caught," &c., instead of "and insufficient to carry steamboats of large burthen. In the peninsula of India, in a hilly country, where we caught," &c.

EXHIBITION OF INVENTIONS AT MECHANICS' INSTITUTIONS.

Sir,—The idea has been proposed, I do not recollect by whom, that Mechanics' Institutions should offer to inventors constant opportunity of exhibiting any novelty in practical science or the useful arts. We are ready to act upon this suggestion, and I would especially mention that our annual "Institutional Reunion," a fête attended by 30,000 to 40,000 persons from all the neighbouring counties, would offer an opportunity for any such purpose not easily surpassed. This year it will be held in the Sheffield Botanical Gardens, on Monday, July 16th.

I shall feel glad, both for inventors to avail themselves of the offer, and for other Institutions who may be able, to make similar arrangements.

Respectfully submitting these suggestions to consideration, I have the honour to remain,

Sir, yours obediently,
JULIAN W. SLATER, Principal.

Sheffield Mechanics' Institution, June 9th, 1855.

REMARKS ON MR. SANDERSON'S PAPER ON THE MANUFACTURE OF STEEL.

Sir,—I was much pleased, in Mr. Sanderson's most valuable paper "On the Steel Manufacture," to notice his intelligent remarks on a subject of such national importance as Mr. Heath's patent improvements, and likewise the letter on the same topic from Mr. Scrivenor. Mr. Sanderson says well it is a pleasure as it is a pride to refer publicly to the merits of such inventors as Mr. Cort. Yet it is said that, proud as we justly are of their achievements, a feeling of shame clouds the recollections of those merits. Cort expended a fortune in perfecting the puddling process; he left it a legacy to wealthy recipients, who give his memory praises which cost nothing to bestow, while his descendants have received no public reward or acknowledgment. The ungracious treatment which inventors have but too often received in this country must surely be added to the catalogue of "sore evils under the sun." Cort's process took a lifetime to perfect; Mr. Heath's invention, by its extreme simplicity, came into operatton in a moment, causing, as Dr. Ure correctly states, an immediate reduction of £30 to £40 on the price of good steel, and up to this date two millions sterling is not an exaggerated computation of the saving which has been effected to British purchasers of steel, with the addition of rendering our country comparatively independent of foreign import. Yet, instantaneous as the change, and speedy as the promise of advantage to the inventor, Heath has fared no better than Cort. The leaden Saturn seems to reign lord paramount in the destiny of inventors. Mr. Heath lived year after year to see the profit of his labours handed over to aliens by the interpretation of those laws which were framed to guard his rights. In a Journal devoted to the Encouragement of Arts, there can hardly be found a subject of more importance than the manufacture of steel, and, as connected with it, a recapitulation of the main facts of this extraordinary patent case. It is well-known the basis of the invention was the discovery of a means by which the intense affinity of metallic manganese for oxygen, and of its oxide for the earths, could be successfully and certainly controlled. By closely incorporating the oxide of manganese with coal tar, Mr. Heath was enabled to smelt with regularity and obtain from the ore any required bulk of carburet of manganese. Manganese has remarkable affinities with iron, as evinced, for instance, in magnetic phenomena, and a further resemblance is presented by the carburet of manganese, which is a compound with carbon precisely analagous to white pig iron. By this union the manganese loses its highly oxidizable character, and maintains a permanent metallic existence. For the want of any certain means of combining the metal with carbon, the carburet was a mere chemical curiosity precariously obtained in very small quantities, but the new means of procuring it in quantity enabled Mr. Heath to investigate substantially the perplexed and long disputed question of the action of manganese on the qualities of iron and steel, and he found that a small quantity of the *permanent metal*, less than 3 per cent. of the weight of steel to be melted, being introduced into the melting pot, uniformly improved the quality of the produce, raising inferior steel to the properties of the best, and thus enabling it to be welded to iron with facility. And I would here remark, that I believe Mr. Sanderson is perfectly correct in his explanation of the *rationale* of this improvement. It entirely corresponds with the view held by the inventor himself, and on which he based other processes for the improvement of iron and steel, namely, that the manganese has the action of a *detergent*, and by its intense affinity under fusion for earthy matter removes from the iron or steel all such particles into the slag which Mr. Sanderson describes as resulting in his experiments. Mr. Dodds, in the discussion, alluded to a process of his own for effecting a similar purification with the aid of alkali. The peculiar difference, in a practical sense, in the use of alkalies arises in their low specific gravity. The greater weight of the manganese approaching to that of the steel or iron, maintains the detergent longer in contact with the fused and fusing metal, and the purification is more complete and certain. But in illustration of the correctness of Mr. Dodds' principle, I may state that in the innumerable experiments made by my father with every variety of foreign and native ore, in the attempt to obtain by de-oxidation without fusion, a pure steel iron, his efforts were perfectly successful with *one ore only*, and this is remarkable for the large amount of soda and potash which analysis exhibits in its composition. The alkali is here placed by nature in that intimate contact with the molecules of iron which is needed for its complete action as a purifier.

But to proceed with the narrative of Mr. Heath's case. The immediate purpose of his experiments had reference to the renowned Wootz ore of Porto Novo, where he had established the iron works now carried on by the East Indian Iron Company. He had no intention of patenting the process, until he found some one else was about to do so, and tax him for the use of his own details. A person at Sheffield was then recommended as an agent for introducing the carburet of manganese to the steel trade; and its amazing properties were speedily recognised and adopted. In proceeding with his operations in London on the Wootz ore, the thought occurred that it would be a great abbreviation to place the requisite quantity of the compound of tar and oxide direct in the crucible with the melting steel, instead of adding the already manufactured metallic carburet. The result was perfect, the deoxidation of the manganese and its combination into a carburet evidently took place, whilst the bulk of steel was undergoing fusion, as precisely the same improvement was effected as when the metallic substance had been introduced. A great economy resulted from doing away with the separate operation of previously manufacturing that metallic substance. Mr. Heath was enabled to reduce the license charge by two-thirds, which he accordingly did and transmitted to his agent *packets* of the *composition*, comprising the *elements* of the carburet in place of the *carburet itself*. It was by this act that he unsuspectingly opened the door to piracy and litigation. The patent claim was for the *use of carburet of manganese* in improving iron or steel, and being aware, as every scientific person must be, that the same effect was produced by the *same cause* in both cases, it never occurred to him to take a patent with a different claim, for any method of *making carburet of manganese*, and which indeed under a correct scientific exposition of the law, would have been worse than unnecessary. To the common eye, however, a black paste and bright medal have a different appearance, and so much so in the eye of Mr. Unwin, that this trustworthy agent commenced on his own account the manufacture of the improved cast-steel with the elements of the carburet; and an importation in the London market of a cheap cutlery, in which the cast-steel was welded to the iron backs, was the first information Mr. Heath had of his agent's fidelity. An action for infringement followed, before Lord Abinger; a scientific witness was explaining to the jury that the small mass of paste of tar and oxide subjected to heat must of necessity form into carburet of manganese, while the larger quantity of steel was melting down, when his lordship asked him if he had been in the pot to *see that done*, or at what time he could put in his finger and take out a piece of the carburet. These highly scientific questions not being satisfactorily answered, the judge directed a non-suit for want of evidence, a decision which was upheld by the full court on application. Mr. Unwin being thus secured the possession of Mr. Heath's property, others were not slow to avail themselves of that which every one might possess except the owner, and the astounding revolution in price described by Dr. Ure was speedily effected. After some time a second action was brought against the agent for further infringements. The judge, Baron Parke, evinced no great leaning towards science, but he did not stop the case like his predecessor, though the evidence had equally warranted it. The verdict was for the plaintiff, but the judge's opinion was obviously the other way, and the defendant obtained from the full Court of Exchequer a reversal in his favour, on the ground that there was neither direct nor *colourable* infringement, for the defendant did not *know* the two elements would form carburet of manganese, and not *knowing that* there could be no *intention* to infringe. After two years of hesitation how best to apply to Chancery for relief, it occurred that this decision, recorded in the reports, was quoted to Lord Cottenham on an argument. His lordship expressed such surprise at a doctrine which subjected the remedy for a civil injury to the *intention* of the wrong doer, that Mr. (now Sir Richard) Bethell was encouraged to move upon the point, and he obtained an order for a new trial. After an infinitude delays, this next act was accomplished in November, 1850, *of eleven years of the patent right having been consumed in fruitless litigation*. No one in court who heard the case, could doubt which way twelve men of common sense would decide, but the judge, Cresswell, interfered, on the ground that he could not, as a single judge, permit the decision of a full court to be shaken, but that the judgment of the Exchequer ought to be re-argued on a bill of exceptions in a Court of Error. Mr. Heath, in failing health, occasioned by the constant annoyance of litigation, felt so keenly this unexpected re-opening of the whole question, that he sunk a few weeks after the trial, and death was added to the other achievements of piracy. His legacy to the widow and the orphan was a law suit, and to the public and to the steel makers the millions sterling which he had saved them. The next scene of these extraordinary legal performances was enacted in June, 1852. A masterly decision of the Court of Error reversed the subtleties of the Exchequer, and maintained the indirect and colourable infringement, by the reasonable assertion that the use of the component parts of a substance was an evasive use of the substance itself. The patent right was thus restored merely to the position where a jury had placed it ten years before. The defendant, not satisfied, of course, appealed to the House of Lords, where it appears the cause is still suspended. Meanwhile the patent having expired, the Privy Council, on the evidence of the extraordinary merit and novelty of the invention, granted the widow an extension of seven years, which appears to promise her an equally beneficial interest as the previous fourteen years. Three costly trials at law, three arguments in court, and the proceedings in Chancery and in the Peers, through years worn out in suspense and anxiety, are hitherto the recompense for a public benefaction. The rare acuteness of the judges of the Exchequer has created the whole mischief. Their science was that fat and soda are not equivalent to soap; that the use of the elements of a dye producing a certain colour is not an evasion of the use of the colour itself, or that bark and sulphuric acid do not originate sulphate of quinine.

Prolonged instruction in the art of opposing a valuable patent leads naturally to perfection. One further detail has to be added to this quasi-legal catalogue. An action for infringement against other defendants was tried at Liverpool in August, 1853. It had now become necessary to find some new kind of evidence. The old was used up, The previous defendant's witnesses had all admitted the novelty and value of the invention, and the only ground of resistance, the denial of a colourable evasion, had been destroyed by the last decision. Fortunately, therefore, half-a-dozen steel-makers were discovered who could swear to having used everything—coal tar, oxide of manganese, &c., &c.—twenty years prior to the date of Mr. Heath's patent. Some of these had actually testified to his originality at the former trials; a curious metaphysical fact is therefore revealed on the properties of age in clearing the memory and revivifying a recollection of the events of youth. A lapse of ten or fiteen years more had brought forgotten things to mind. This evidence gave the defendants a verdict, but it appearing the alleged use had been strictly secret, the court was moved that there had been no publication sufficient to invalidate a patent claim. But Lord Campbell ruled, no doubt correctly, that if the evidence was true, it was impossible to consider that to be a patentable secret which half-a-dozen manufacturers had commonly used. The fact remained unexplained why a process which occasioned such extraordinary changes after being patented had produced neither public nor private benefit in the hands of these six men.

The moral of the tale appears to be the utter powerlessness to save which resides in the arm of the law concerning patent rights. Had the makers of steel received a proposal that for a remuneration of five per cent. on the profits to accrue, a means would be imparted to them which could certainly add £30 to £40 per ton to the value of inferior metal, or if such a process had been freely imparted, leaving it to their honour to make the inventor an adequate compensation, we can hardly doubt what course Englishmen would have taken. But when his merit is brought before the tribunals of justice there exists such a variety of acuteness in the judicial minds that they are unable to agree during the space of fourteen years, whether the law entitles such a public benefactor to any benefit for his discovery, even to the amount of fees paid to the fountain of justice purposely to secure a right. Mr. Sanderson may well express pride at the development which such inventors afford to their country, though feeling less proud of the return which it makes them. Let us hope for a change; there is a great promise at present of putting the right men in the right places, and we may trust to see patentees placed rightly also, not the pirate in possession and the inventor in the grave.

When a safe and certain method of using a difficult material has been once established a power of experimenting is obtained, which leads to great simplifications. The obstacle to any regular course of experiment on the supposed effect of manganese on the quality of steel was the intense affinity of its oxide for the earths of the crucible, the melting pots being rapidly cut through, and the charge lost, as repeatedly proved in Court. And no means existed for preserving this highly oxidizable metal so as to apply it in a metallic form. A means of arresting its oxidation being once discovered by Mr. Heath, the simple modification followed of employing those means at great economy in the one operation of melting steel, the most suitable *time* for inserting the detergent being then ascertained by experiment. I am informed that a change of still greater simplicity has been effected. As soon as the fusion of the steel commences, and the bottom of the pot is covered by a liquid stratum sufficient to protect its earthy substance, I am told that a small quantity of oxide of manganese, *without any mixture of coal tar or other carbonaceous matter*, is carefully placed upon this liquid couch, and deriving a competent dose of carbon from the steel itself to convert it into carburet, it effects the purification of the whole material of the ingot gradually melting down. Surely it would be to the honour of our legal code were it able to dictate that he who opens the door to such a course of progressive advancement should have some other recompense than paying costs while judges dispute. These disputes encourage the meanest passions, and sacrifice the substantive rights of the clearest merit to verbal altercation. The *letter* of the patent law is, that where the patentee's *merit* is clear, *words* shall be interpreted in his favour. It is said that further simplifications have been attained as a consequence of Mr. Heath's demonstration that steel may be purified and refined, but we must receive these assertions ***cum grano***, especially the report that a general improvement is independent of the use of manganese. It is most natural that all who can be connected even by the remotest implication with the opposition to this patent should seek some excuse or cover from sharing the stigma attached to such determined proceedings.

I shall be greatly pleased to hear of the progress and success of Mr. Sanderson's deoxidizing arrangements. He will realise a great desideratum, if he obtains that homogeneous texture of metal from the Cumberland and Lancashire hæmatites which my father could never accomplish in this way. Mr. Heath proposed to use the detergent qualities of manganese in such a process, and it certainly is the most promising adjunct. Though these hæmatites are highly silicated, they are the purest British ores which can be obtained in bulk. The rich alkaline ore to which I have refered, and from which alone by the direct process my father manufactured a steel equal to the highest foreign marks, as exhibited in the fine cutlery made from it by Mr. Pepys, is too precarious in quantity, and he abandoned all hopes of employing it in a profitable manufacture.

I know not in what year Vanoccio flourished, but I would remark that the process ascribed to him of making steel by immersing wrought-iron in liquid cast-iron appears of considerable antiquity. In Julius Agricola's work on Metallurgy, dated 1566, it is described as commonly in use in Saxony, and it was found by Mr. Heath to be one of the native operations in the East Indies for making steel from the Wootz ore. Considering how ancient are the traditions of the east, we are warranted in assuming the remarkable fact that grey cast-iron was known and made many centuries prior to its application in the manufacture of castings.

I am, Sir, your obedient servant,
DAVID MUSHET.

May 15th, 1855.

P.S.—Most gratifying is it to see the farmer of Hendon who taught us a new way to plough the deep, receiving so noble an offering from the engineers; one public benefactor at least will be rewarded in his lifetime by those he has eminently served; the gratitude of the Sheffield trade can now flow only to the representatives of *their* benefactor.

BOARD MANAGEMENT *VERSUS* INDIVIDUAL RESPONSIBILITY.

Sir,—The Earl of Hardwicke, when in the chair last week at a meeting of the Society of Arts, observed that it seemed desirable to institute a Board for the examination of proposals for improvements. The same opinion had been entertained towards the end of the last century by Lord Barham, then Sir Charles Middleton, and the matter was discussed by ministers. After much consideration, it was determined to institute the office of an Inspector-General of Naval Works, making it a part of his duty to report his opinion to the Admiralty of all proposals for improvements. Accordingly the Inspector-General (Sir Samuel Bentham) did so during the thirteen years that elapsed ere his office was abolished. During that long period the plan was found to work well. It must be noted, however, that he acted under the strictest personal responsibility for the opinions he submitted to their Lordships of the Admiralty; he had no associate signatures to cover errors, or to conceal partialities, to both of which a *Board* is liable. The Inspector-General uniformly stated the *reasons* on which his opinion was based, and it was on that basis that their Lorships were left to decide, he having had no authority himself. Several applicants refused to disclose their plans, probably feeling they would not stand the test of scientific examination; other proposals were recommended for experiment, some to be adopted, but no one was objected to without a full statement of the *reasons* which rendered it inapplicable.

During that long course of years it was only on *one* occasion that the Inspector-General was accused of *partiality*, and in that instance he had refused a considerable bribe, and on a repetition of the offer in *writing* he sent the letter to the Board of Admiralty.*

Such is the effect of *individual responsibility*, a doctrine which Sir Samuel Bentham uniformly upheld, and endeavoured to introduce in the Civil Naval Department as it already exists in the military branch with such pre-eminently good results.

I am, Sir, your obedient servant,
M. S. BENTHAM.

May 22nd, 1855.

Proceedings of Institutions.

Royston.—During the past sixteen months great efforts have been made to raise a fund for the erection of a Building to contain a Lecture Hall, and Rooms for a Museum, a Library, and for Reading and Class Instruction in connection with the Institute. The efforts have been so far successful as to justify the trustees and committee in undertaking the erection of the structure; and early on Saturday morning, the 16th inst., the ceremony of laying the foundation-stone took place. The meeting having unanimously called upon Henry Thurnall, Esq., to preside on the occasion, he addressed the assembly, concluding by announcing that Miss Phillips, daughter of one of the most zealous supporters of the Institute, had most kindly consented to lay the first stone. He then presented to her a handsome silver trowel, which had been purchased by the inhabitants of Royston, and was presented to Miss Phillips in commemoration of the event of the day. Some coins of the realm, and a small bottle containing some documents, having been placed in a suitable receptacle, the Foundation Stone of "The Royston Institute" was carefully laid over them. Mr. John Warren (of whom the chairman said that "had there been no John Warren there would have been no Royston Institute)" stepped forward and said that as long as life lasted, he should cherish the remembrance of the liberality of all the subscribers to the building, and he would strive to feel as thankful to the poor man for his penny as to the rich man for his pound. He could not avoid, however, remarking that some of his townsmen, and many in the neighbourhood, had not yet subscribed; he hoped eventually to number all among the subscribers, and he urged all present to aid him in collecting more money. He was proud to say that some of their subscribers resided even in Australia.—A certain additional amount of money being required to complete the undertaking—say £500—it was self-evident, the more they collected the less they would have to borrow, and everybody would agree that a large debt was undesirable. A vote of thanks to the chairman concluded the business of the meeting.

To Correspondents.

Erratum.—In Mr. G. H. Bengough's letter on "Reformatory Discipline," in No. 133, page 525, col. 1, last line, and col. 2, first line, for "certainly more sinned against," read "certainly *not* more sinned against," &c.

MEETINGS FOR THE ENSUING WEEK.

Mon. Actuaries, 7. Herr Rath G. Hopf "On the Results of the Operations of the Gotha Life Assurance Bank for the First Twenty-five Years, particularly as regards the Mortality amongst the Lives Assured."
Geographical, 8½. 1. Capt. Collinson, R.N., "On the Geographical Results of his late Researches in the Arctic Regions in Her Majesty's Ship *Enterprise*." 2. Dr. R. A. Philippi, "Exploration of the Desert of Atacama"
Tues. Med. and Chirurg. 8½.
Zoological, 9.
Wed. Royal Soc. Literature, 8½.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Delivered on 7th June, 1855.

Par. No.
255. Cholera—Copies of Letters.
256. Committee of Selection—12th Report.
264. Register of Voters—Abstract Return.
271. Dublin Port—Account.
278. Geological Survey (Ireland)—Return.
244. Public Health Bill, and Nuisances Removal Bill—Report from the Select Committee.
275. Spirits (Navy)—Contracts (a corrected Copy).
154. Bills—Jurisdiction of the Stannary Court Amendment (amended).
155. Bills—Stamp Duties Repeal on Matriculation and Degrees (Oxford).
156. Insurance on Lives Abatement of Income Tax Continuance.
Cathedral and Collegiate Churches—3rd and Final Report of the Commissioners.

Delivered on 8th June, 1855.

209. Militia—Return.
279. East India Company's Stock—Return.
293. Navy Surgeons, &c.—Return.
153. Bills—Youthful Offenders.
158. Bills—Gold Finger Rings.
159. Bills—Assay Offices (York, &c.)—Abolition.

Delivered on 9th and 11th of June, 1855.

283. Transports—Return.
259. Loan Fund Societies (Ireland)—Report from Committee.
110. Local Acts (35, East Kent Railway) (Extension to Dover)—Reports from the Admiralty.
232. Irish Reproductive Loan Fund—Account.
272. East India Railways—Return.
280. East India Loans—Extract of a Despatch.
286. Education (Scotland) Bill—Copy of Correspondence.
294. Dublin Hospitals—Copy of Commission.
296. Church Affairs (Victoria)—Copy of an Act.
157. Bills—Dwelling Houses (Scotland) (amended).
160. Bills—Spirits (Ireland) Act Amendment (amended).
162. Bills—Excise Duties.
163. Bills—Spirit of Wine.
164. Bills—Acts of Parliament Amending.
165. Woolmer Forest (amended).
Cathedral and Collegiate Churches—2nd Report of the Commissioners.
Loan Fund Board of Ireland—17th Report of the Commissioners.
Incumbered Estates Inquiry Commission (Ireland)—Report.

Session 1854.

449. Titles, Contents, and Indexes to the Sessional Printed Papers.

Delivered on 12th June, 1855.

285. Draftsmen of Bills in Parliament—Return.
297. Receipt and Draft Stamps—Return.
290. Civil Service Provident Fund—Copy of a Letter, &c.
289. Cheese—Account.
292. Ecclesiastical Commission and Church Estates Commission—Return.
161. Bills—Cinque Ports (amended).
166. Bills—Validity of Proceedings (House of Commons).

Delivered on June 13th, 1855.

287. Coals, cinders, and culm—Account.
288. Iron, &c.—Return
301. New South Wales—Copies of Petitions.
167. Bills—Railways (Ireland) (amended.)
War with Russia; correspondence relative to addresses, &c., received from the British Colonies.
Consumption of smoke—Copy of a letter &c., &c.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, June* 15*th*, 1855.]

Dated 21*st February*, 1855.

379. J. A. Telle, Paris—Railways for cities and towns.

Dated 13*th March*, 1855.

557. E. Bourseret, Paris—Bolts, rivets, &c.

Dated 22*nd March*, 1855.

635. J. Snowden, Dartford—Furnaces and fire places.

Dated 26*th March*, 1855.

667. H. C. Hill, Parker-street, Kingsland—Waterproof flocked cloth and other fabrics.

Dated 3*rd April*, 1855.

745. L. Cornides, 4, Trafalgar-square—Rendering leather, paper, and textile fabrics impervious to water.

Dated 13*th April*, 1855.

817. W. Weallens and G. A. Crow, Newcastle-on-Tyne—Marine engines.

Dated 19*th April*, 1855.

865. T. Jackson, Commercial-road, Pimlico—Railway signals.
869. C. M. Congreve, New York—Iron. (A communication.)

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* See Naval Papers No. 2, pages 132 and 133.

Dated 12*th May*, 1855.

1073. J. Beckett, Preston—Spinning machinery.

Dated 18*th May*, 1855.

1121. C. C. E. Minié, Paris—Breech-loading fire-arms.
1123. E. Morewood and G. Rogers, Enfield—Coating wrought iron.
1125. W. H. D. Granville, Stokenchurch, Oxford—Fire-arms and cartridges.

Dated 21*st May*, 1855.

1127. W. H. Tucker, Fleet street—Locks.
1129. H. H. Watson, Little Bolton, and J. Oliver, Over Hulton—Fuel.
1131. P. F. Didot, Paris—Bleaching paper pulp, &c.
1133. F. W. Mowbray, Shipley, near Leeds—Looms.
1135. E. H. Bennett, Birmingham—Roasting jacks.
1137. H. Whitaker, Buffalo, New York—Propulsion of steam vessels.
1139. I. J. Silbermann, jun., Paris—Printing.
1141. W. Longmaid, Victoria-cottage, Stoke Newington, and J. Longbottom, Leeds—Heating coppers, pans, and boilers.
1143. T. G. Shaw, Old Broad-street—Conductor for decanting wine, &c.
1145. W. Mac Naught, Manchester—Steam boilers.
1147. J. Shanks, Arbroath—Mowing machines.
1149. J. H. Johnson, 47, Lincoln's-inn-fields—Vulcanising and rendering hard, india rubber and gutta percha, and application of to parts of machinery, &c. (A communication.)

Dated 22*nd May*, 1855.

1151. H. E. Scott, Brixton—Ships.
1153. G. Collier, Halifax—Looms.
1155. T. Holt and J. Sagar, Blackburn—Looms.

Dated 23*rd May*, 1855.

1157. J. J. Meyer, Rochdale—Shaping wood.
1159. J. Eden, Lytham—Drying fabrics.
1161. D. L. Davis, Dedham, Massachusetts—Elastic bearings for chairs and rails.
1163. A. V. Newton, 66, Chancery-lane—Beehives. (A communication.)
1165. W. Smith, 10, Salisbury-street, Adelphi—Safety apparatus for steam boilers. (A communication.)

Dated 24*th May*, 1855.

1167. J. A. Longridge, Newcastle-on-Tyne—Artillery.
1169. J. Mitchell and J. Entwisle, Bury—Presser flyers for roving frames.
1171. J. Hudson, Laurel-place, Dalston, and G. R. Williams, Stanley-street, Chelsea—Water meters.
1173. G. W. Muir, Glasgow, and M. Gray, Bonhill, N.B.—Admitting air to furnaces.
1179. J. Addenbrooke, Bartlett's-passage—Machinery for folding envelopes.

Dated 25*th May*, 1855.

1181. E. Haseler, Wolverhampton—Picture frames.
1183. A. Melville, 50, Baker-street, Portman-square—Breech-loading fire-arms and projectiles.
1185. J. H. Poullain, Paris—Penholder.
1187. H. H. Henson, Parliament-street—Goods wrappers.
1189. A. P. Jaccard, Ste. Croix, Switzerland—Centre seconds movement for watches. (A communication.)

Dated 26*th May*, 1855.

1191. F. H. Maberly, Stowmarket—Fire-arms.
1192. J. L. Lorand, 11, William-street, Hampstead-road—Railway break.
1193. T. Mather, Preston—Pistons.
1197. A. J. H. Parent, Paris—Buttons, nails, and metallic and plastic articles.
1199. C. W. Harrison, Woolwich—Metal ropes, cables, and rods.
1200. A. E. L. Bellford, 32, Essex-street, Strand—Envelope machinery. (A communication.)
1201. A. E. L. Bellford, 32, Essex-street, Strand—Steam-engine regulator. (A communication.)
1203. J. Avery, 32, Essex street, Strand—Conveying heavy weights for bridge building, &c. (A communication.)
1205. G. Neuffer, 39, Finsbury-square—Producing patterns upon floor cloths and other ornamental coverings.
1207. T. Waterhouse, Sheffield—Actuating forge hammers and pile driving. (A communication.)

Dated 28*th May*, 1855.

1209. J. B. Howell, Sheffield—Consuming gaseous products in combustion of fuel.
1211. B. Fullwood, 6, Kirby street, East India-road—Purification of mineral, vegetable, and animal matters containing oily, bituminous, &c., qualities.
1213. J. Morrison, 10, Arlington-square, New North-road—Railways.
1215. E. M. Roch, Paris—Reading or bringing into sight advertisement bills, &c.
1217. A. E. L. Bellford, 32, Essex-street, Strand—Sewing machines. (A communication.)
1219. J. Whitehead, jun., and R. K. Whitehead, Elton, near Bury—Finishing woven fabrics.
1221. H. Grafton, Rolles-buildings, Fetter-lane—Heating and cooking apparatus.
1222. A. Coleman, Chelmsford—Land rollers and scarifiers.

Dated 29*th May*, 1855.

1223. D. Dunn, 9, King's-road, Pentonville—Steam boilers.
1225. E. J. Lalond and Count L. A. de Chatauvillard, Belleville, near Paris—Obtaining oils, essences, paraffine, &c.
1227. E. Clowes, King's Bench-walk, Temple—Spring. (A communication.)
1229. T. V. Lee, Dulwich—Generating steam.
1231. W. A. Henry, Sheffield—Vices.
1233. J. H. Johnson, 47, Lincoln's-inn-fields—Stamping and embossing presses. (A communication.)

Dated 30*th May*, 1855.

1235. R. D. Aked, 28, Matilda-street, Caledonian-road—Stands for crotchet reels.

Dated 31*st May*, 1855.

1237. E. Wharton, Birmingham—Ordnance and fire-arms.
1238. E. Wharton, Birmingham—Metal tubes.
1239. E. Wharton, Birmingham—Steam engines.
1240. J. L. Jullion, Tovil—Paper, &c.
1241. J. Leetch, Westminster—Helmet.
1242. W. Rimington, jun., Craven, Yorkshire—Spring hinge for swing doors.
1243. C. T. Dunlop, Glasgow—Chlorine.
1244. Sir J. W. Lubbock, Bart., Mansion-house-street — Telescopes, &c.
1245. H. Sachs, Newgate-street—Fountain pen.
1246. S. Bickerton, Oldham—Oil lubricator.
1247. Baron Espiard de Cologne, Paris—Diving apparatus.
1248. R. Ashworth and S. Stott, Rochdale—Spinning machinery.
1249. T. Worsdell, Birmingham—Lifting jacks.
1250. R. A. Brooman, 166, Fleet-street—Dyeing cotton, threads, yarns, and twists. (A communication.)

Dated 1*st June*, 1855.

1251. A. Jackson and E. Kershaw, Manchester, and J. Roberts, Failsworth, near Manchester—Looms.
1252. P. A. le Comte de Fontaine Moreau, Paris—Oils. (A communication.)
1253. R. Peyton, Birmingham, and A. S. Stocker, Poultry—Bedsteads.
1254. C. J. C. Venant, Amiens—Roasting coffee.
1255. J. C. Pellenz, Aix-la Chapelle—Iron wheels.
1256. R. Whytock, Edinburgh—Colouring yarns.
1257. H. Spencer, Rochdale—Twisting and winding spun yarns.

Dated 2*nd June*, 1855.

1258. J. Boyd, Ashbocking—Letter press printing machines.
1259. J. Lane, Liverpool, and J. Taylor, Birkenhead—Engine.
1260. T. Taylor and W. Smith, Manchester—Railway chairs.
1261. C. Coe, Manchester—Druggets, pilot cloths, blankets, &c. (A communication.)
1262. C. Little, Derby—Envelope machinery.
1263. H. Cartwright, Dean, Broseley—Steam cock.
1264. F. C. Armelin, jun., Dragnignan—Ploughs.
1266. J. T. Dore, Southampton—Needle and button cases.

Dated 4*th June*, 1855.

1268. P. A. Godefroy, 3, King's Mead-cottages, New North-road—Gutta percha.
1272. W. Eley, 38, Broad-street, Golden-square—Caps for fire-arms.

Dated 5*th June*, 1855.

1278. J. Gedge, 4, Wellington-street South, Strand—Securing contents of bottles. (A communication.)
1280. D. N. B. Coffin, jun., Massachusetts—Stop cocks.
1282. C. Curtice, Massachusetts—Burglar annunciator. (A communication.)
1284. E. Allen, Massachusetts—Breech-loading fire-arm.
1286. W. E. Newton, 66, Chancery-lane—Rolling bar iron. (A communication.)

Dated 6*th June*, 1855.

1288. J. Gedge, 4, Wellington-street South, Strand—Preserving grain. (A communication.)
1290. J. Fielding and W. Hopwood, Blackburn—Looms.
1292. G. Hopper, Houghton-le-Spring—Rolling and shaping metals.
1294. J. Robertson, Ardrossan—Transmitting motive power.
1296. J. Boucher, 3, Surrey-villas, Camberwell New-road—Powder flasks, and sights and ramrods.

Dated 7*th June*, 1855.

1300. J. Buncle, Springfield, Linlithgow—Bleaching resinous substances (calophane) for the manufacture of soap.
1302. T. Ogden, Manchester—Spinning machinery.
1304. J. A. Reynolds, Elmira, New York—Machinery for discharging vollies of shot.
1306. C. C. J. Guffroy. Lille—Smoke-consuming apparatus.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
3727	June 9.	Portable Camp Cooking Apparatus	Edmund Cobbett	34, Villiers-street, Strand.
3728	„ 13.	A Compound Valve for Hydraulic Presses and other purposes	Peel, Williams, and Peel	Manchester.
3729	„ 13.	The Allied Army Tent	John Hill	212, Piccadilly.
3730	„ 19.	A Sun Shade or Parasol	Charles Burton	162, Regent-street.